

No. 7 — *New Cave and Epigean Millipeds of the United States, with Notes on Some Established Species*<sup>1</sup>

By H. F. LOOMIS

The present paper is based largely on collections of millipeds made by Mr. Leslie Hubricht, of the Missouri Botanic Garden, St. Louis, Missouri, and includes many surface species although his interest was centered on cave forms. His collections were begun in the summer of 1939 and extended into the spring of 1941 and included species from Alabama, Florida, Georgia, Illinois, Indiana, Kentucky, Missouri, North Carolina, Oklahoma, Pennsylvania, Tennessee, Virginia and West Virginia. The work was made possible by assistance from a research grant from the American Association for the Advancement of Science.

The Hubricht collection contained twenty-nine identifiable species of millipeds of which 19 previously have been described, thus leaving ten to be described. Of these latter species three have been made types of new genera; one the type of a new family; and the remaining six species have been placed in existing genera. In addition to the foregoing species, notes and descriptions of a few other species have been included where these have bearing on the paper or are needed in reference to synonymy.

Type specimens of the newly described forms are deposited in the Museum of Comparative Zoölogy, with paratype specimens deposited in the U. S. National Museum, except for one species, *Conotyla humerosa*, where deposit of type and paratype specimens has been reversed.

GLOMERIDAE

The three genera of this family now known from the United States are diagnosed in the following key.

- Head not deeply and extensively depressed on either side for the accommodation of the antennae; vertex broadly convex; second segment without a deep groove proceeding upward from the lateral cleft. . . . . *Sonoromeris* Silvestri
- Each side of head almost completely depressed, fully accommodating the antennae and restricting the vertex to a narrow ridge; second segment with a deep groove proceeding upward from the lateral cleft. . . . .
- Body smooth and finely punctate; males with the seventeenth legs composed of only three rudimentary joints above the enlarged coxae; nineteenth legs with large finely corrugated processes on the posterior face of the last two joints. . . . . *Onomeris* Cook

<sup>1</sup> Published with the aid of a special gift from Mr. George R. Agassiz.

Body densely but minutely hispidulous, the setae rising from tiny punctures; males with the seventeenth legs somewhat reduced in size but composed of four normal joints above the enlarged coxae; nineteenth legs without corrugated processes on the posterior face of any of the joints. . . . . *Trichomeris* gen. nov.

TRICHOMERIS GENUS NOV.

Body short and stout, only about twice as long as wide; very strongly convex; moderately pigmented; surface shining but densely and minutely hispid.

Head greatly depressed on each side for the reception of the antennae as in *Onomeris* and with the vertex similarly carinate, but in addition to the marginal row of ocelli found in that genus another ocellus is located behind the marginal series and is invisible from the front.

First and second segments much as in *Onomeris* although the latter has somewhat fewer striae above and in front of the deep groove proceeding from the postero-lateral cleft.

Segments 2 to 11 inclusive with the posterior margin broadly and very shallowly emarginate on either side of the middle, causing the margin to appear to be caudally produced backward into an obtuse angle, this condition most plainly evident on the median segments.

Last segment as in *Onomeris*, evenly rounded behind in the female but abruptly emarginate at middle in the male.

Males with seventeenth legs somewhat reduced in size and with four joints, instead of three as in *Onomeris*, in addition to the enlarged coxae; eighteenth legs apparently much as in that genus but the nineteenth legs, although having several large lobes on the joints, lack "large finely corrugated processes from the posterior face of the last two joints" as mentioned in Cook's description of *Onomeris*.<sup>1</sup>

Type. *T. sinuata* spec. nov.

TRICHOMERIS SINUATA SPEC. NOV.

Eleven specimens, A-5896, including the male type, collected "along pipeline trail below summit escarpment", Monte Sano State Park, 6 miles south-east of Huntsville, Madison Co., Alabama, April 12, 1941.

*Description.* Body short and stout, from 5 to 6 mm. long and from 3 to 3.2 mm. wide; surface of segments shining but strong magnification shows it to be densely beset with tiny short, erect bristles rising from minute punctations.

<sup>1</sup>Brandtia, pp. 43-45, 1896.

General color light brown; head with front colorless, elsewhere variably brown; basal joints of antennae colorless but thereafter gradually darkening to joint 7 which is colorless; first segment with a

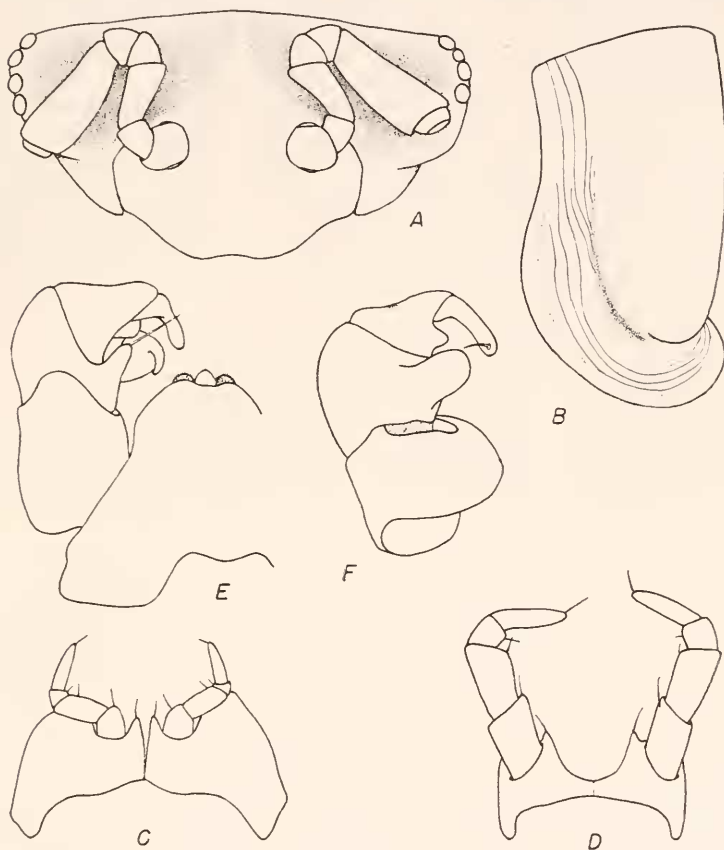


Fig. 1. *Trichomeris sinuata*. a, Head, anterior view; b, Segment 2, lateral view; c, Seventeenth legs of male, ventral view; d, Eighteenth legs of male, ventral view; e, Nineteenth leg of male, ventral view; f, Nineteenth leg of male, dorsal view.

large oval, transverse, light-maculate area occupying more than half the surface and crossed by two striae which are dark and in strong contrast; entire border of segment narrowly light colored; ensuing

segments to the solidly light brown last segment with a large oval, transverse light-maculate area on each side, the dorsum solidly brown; posterior margin of all segments light colored.

Head (Fig. 1 *a*) with vertex carinate, on each side of which the surface is deeply depressed to the series of 4 or 5 ocelli which are located on the lateral margin; behind this series, near its upper end, is another normal ocellus which is invisible from in front.

Segment 1 shaped as in *Onomeris* and also with similar twin striae.

Segment 2 much as in *Onomeris* but with fewer striae, usually only three crossing the dorsum as shown in figure 1 *b*. Segments 2 to 11 inclusive with the posterior border shallowly but broadly emarginate on either side of the middle, causing it to have the appearance of being produced backward into an obtuse angle more evident on the middle segments than on the subterminal ones.

Last segment large and hood-like as in *Onomeris*, that of the male being sharply emarginate at the middle of the posterior margin while in the female the margin is evenly continuous.

Males with seventeenth legs as shown in figure 1 *c*, having four joints above the enlarged coxae; eighteenth and nineteenth legs as shown in figure 1, *d*, *e* and *f*, the nineteenth legs without the corrugated processes on the posterior face of the two outer joints, as found in *Onomeris*.

## POLYZONIIDAE

### POLYZONIUM BIVIRGATUM (Wood)

Eight specimens, A-5041, from "The Loop", 10 miles south of Gatlinburg, Sevier Co., Tenn., Aug. 10, 1939.

## ANDROGNATHIDAE

### BRACHYCYBE PETASATA Loomis

Many specimens, A-5004, from under logs near Chimney's Camp, Great Smoky Mountains National Park, Sevier Co., Tenn., Aug. 10, 1939.

## CLEIDOGONIDAE

### PSEUDOTREMIA PRINCEPS Loomis

Many specimens, A-5011, from Luke's Cave, Teeterton, Pendleton Co., W. Va., Aug. 23, 1939.

*PSEUDOTREMA VALGA* spec. nov.

A mature male (Type), six mature females and several young from King Solomon's Cave, Cumberland Gap, Tenn., July 26, 1924, G. P. Englehardt, collector.

*Diagnosis.* Located in the *P. princeps* series but with thicker, more prominent shoulders, particularly on the segments behind the anterior fourth of the body, than any of the other species; the bowed gonopods to which the specific name alludes, also are diagnostic.

*Description.* Male 22 mm. long, largest female 24 mm. long; body increasing in width to segments 6 and 7, thereafter narrowing very gradually until the last half dozen segments where it narrows more rapidly; dorsum much flatter than in *P. princeps*; color in alcohol ranging from brownish to bluish slate-gray.

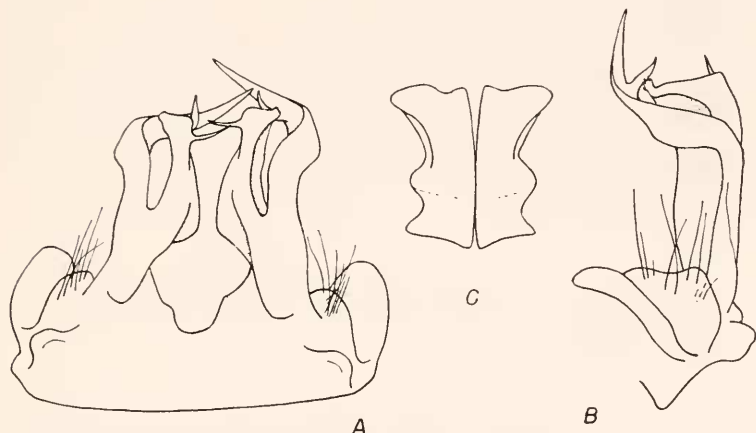


Fig. 2. *Pseudotremia valga*. a, Gonopods, anterior view; b, Gonopod, outer view from somewhat behind; c, Bifid laminae of gonopods, posterior view.

Ocelli dark brown or black, in a triangular group composed of 20 to 22 ocelli in six series paralleling the margin of the first segment, the distribution of ocelli approximately 6, 5, 4, 3, 2, 1, counting downward.

First segment with lateral angles scarcely projecting and not obviously thickened; second segment with moderately thick, slightly projecting, simple shoulders composed of a single ridge with a seta in front on the upper side, and another, the outer of the three dorsal setae, on the side of the body near the posterior end; succeeding seg-

ments with lateral shoulders prominent and compound, composed of a very thick elevated ridge or elongate swelling, sharply set off from the dorsal surface, with the second or middle seta at its upper anterior limit; on the outer side of this conspicuous swelling, and somewhat below its crest, is a very much smaller slender ridge which bears the outer seta at its posterior end; these compound shoulders are prominently projecting from segment 3 to about segment 22 or 23 and are faintly evident on two or three of the ensuing segments; lateral striations strongly evident on all but the last several segments; dorsum of the anterior segments smooth or at most with slight unevenness of surface; from the mid-body segments to segment 22 or 23 there are a few low, elongate swellings near the shoulders, and on the segments of the third quarter of the body several additional rounded, vesiculate swellings, which could almost be called tubercles, near the posterior margin.

Gonopods as shown in figure 2 *a*, and *b*, the apex of each bent backward between the ninth legs and covering the bifid laminae, the latter illustrated in figure 2 *c*; ninth legs 5-jointed, the four outer joints similar to those of *P. princeps* but the basal joint with a prominent lobe on the inner face; coxal prominences of the eleventh legs long and slender; legs 3 to 7 with a spongy pad beneath the last joint but none on the legs following the gonopods.

#### PSEUDOTREMIA CAVERNARUM Cope

A mature female and two young ones, A-4848, from Wyandotte Cave, Crawford Co., Indiana, Sept. 1, 1939.

#### PSEUDOTREMIA NODOSA Loomis

A half dozen broken specimens from English Cave, Powell River, Tenn., July 27, 1924, collected by G. P. Englehardt and received from the Museum of Comparative Zoology for identification.

#### PSEUDOTREMIA FULGIDA spec. nov.

Several males (one the type) and several females, A-4986, from Higginbotham Cave, 1.5 miles northwest of Frankford; and one female, A-5035, from Hayes Cave, .5 mile north of Lewisburg, Greenbrier Co., W. Va., Aug. 24, 1939.

*Diagnosis.* This species has an unusually slender body with no tubercles on the dorsum of any of the segments except several im-

mediately preceding the last segment; dorsal setae long and slender instead of short and clavate; no other species has eyes composed of so few ocelli.

*Description.* Largest specimen, a female, 20 mm. long; females subulate in outline, males quite fusiform, being distinctly widest at segments 6 and 7; body without pigmentation except for a small dilute brownish area at each eye, the colorless ocelli being set in this spot.

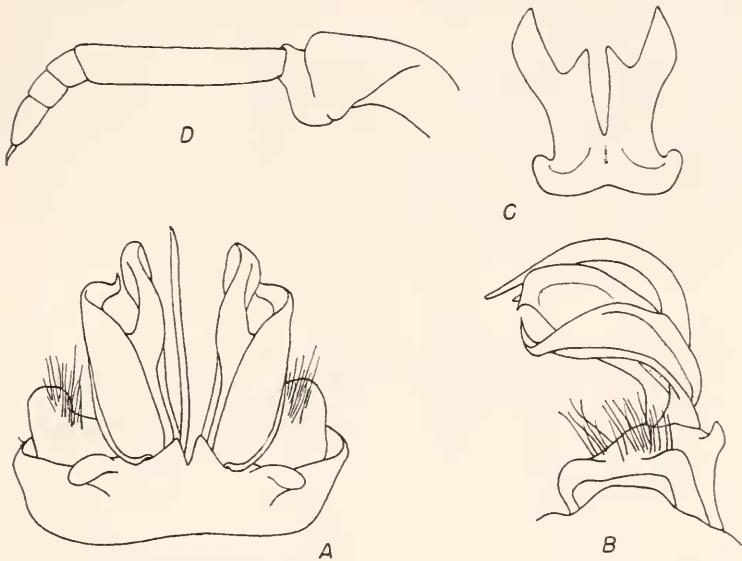


Fig. 3. *Pseudotremia fulgida*. a, Gonopods, anterior view; b, Gonopod, outer lateral view; c, Bifid laminae of gonopods, posterior view; d, Ninth leg of male.

Head with ocelli small and few in number, from 5 to 7 only, in a single series or with one or two ocelli above or below the single series; vertex smooth and shining with a few slender, erect setae; front smooth and shining above, becoming subrugose below, and with erect setae increasing in number below; clypeus distinctly rugose and densely setose; labrum smooth, shining, and deeply emarginate; antennae long and slender, the joints increasing in length in the following order—1, 7, 6, 2, 4, 5, 3.

Segments entirely smooth and shining above, the prozonites as well as the metazonites, the six dorsal setae of the latter long, slenderly acuminate and suberect; lateral shoulders of the male evident from the second to about the fourteenth segment but only to the eleventh segment in the female; males with the body broadening rapidly to segments 6 and 7 which are twice as wide as segment 2 and half again as wide as segment 14 and those that follow; females with anterior end of body increasing less in width to segments 6 and 7, behind which the body is parallel-sided to the caudal segments which narrow gradually; sides of segments with eight to ten striations which vanish on the posterior segments.

Male gonopods as shown in figure 3, *a* and *b*, with a simple falcate median structure analagous to that shown by Cook and Collins for *P. cavernarum* Cope<sup>1</sup>. The bifid laminae are shown in figure 3, *c*; ninth legs of male rather long, 5-jointed, as shown in figure 3, *d*; eleventh legs with a prominent, slightly curved, conic lobe projecting back from the posterior face of each coxa into a special recess in the anterior face of the coxa of the following leg.

#### PSEUDOTREMIA spp.

Mature females or immature specimens which could not be assigned to species with absolute certainty were collected in the following localities. Five immature specimens, A-5029, from Barker Cave, 6 miles north of Huntsville, Madison Co., Alabama, Aug. 5, 1939; many females and several immature specimens, A-5035, from Hayes Cave, one half mile north of Lewisburg, Greenbrier Co., W. Va., Aug. 24, 1939; one female, A-4986, from Higginbotham Cave, 1.5 miles northwest of Frankford, Greenbrier Co., W. Va., Aug. 24, 1939; two females and 5 immature specimens, A-5036, from Chimney Cave., 2.3 miles southwest of Pounding Mill, Tazewell Co., Va., Aug. 25, 1939; 1 immature specimen, A-4905, from Cudjo's Cave, near Cumberland Gap, Lee Co., Va., Aug. 28, 1939.

#### DEAROLFIA LUSCIOSA Loomis

Many specimens, A-5013, from Seneca Caverns, near Riverton, Pendleton Co., W. Va., Aug. 22, 1939, Leslie Hubricht; about 8 specimens from Schoolhouse Cave, near Seneca, Pendleton Co., W. Va., July 4, 1940, Charles H. Daniels.

#### CLEIDOGONA sp.

A very young specimen, A-5049, from Monte Sano State Park, east of Huntsville, Madison Co. Alabama (no date).

<sup>1</sup> Ann. N. Y. Acad. Sci., Vol. 9, Plate I, Fig. 2, 1895.



## CONOTYLIDAE

## CONOTYLA Cook &amp; Collins

The genus *Conotyla* has doubled in size since its original treatment in 1895 by Cook & Collins without any attempt to bring the species into orderly arrangement. Examination of the literature usually shows few or no records of a given species after announcement of its discovery and in the original description or subsequent structural notes that have appeared there is no single character, not even exact measurements of length, that can be found common to all species. Another factor that makes comparison and identification of species difficult is that some of them were founded on female specimens, a practice to be condemned in the taxonomy of millipeds unless very outstanding differences of structure are exhibited. In the present genus the females of many species are without distinctive specific characters and it is only through association of collection with males that they may be safely identified. In spite of this unsatisfactory condition an attempt has been made to prepare a key from examination of specimens and existing descriptions that may aid recognition of the species.

*Key to the species of Conotyla**Species of which males are known*

- Body without color; lateral carinae large and prominent; ocelli reduced in number, 7 to 10 in an oblong group . . . . . *humerosa* spec. nov.
- Body with more or less color; lateral carinae small and not prominent; ocelli 15 or more in a triangular or quadrate group . . . . .
- Dorsum finely hispid . . . . . *bollmani* McNeill
- Dorsum not hispid but reticulated, semi-rugose or smooth . . . . .
- Ocelli in more than 5 series, usually in 7 series . . . . . *deseretae* Chamberlin
- Ocelli in 5 series or fewer . . . . .
- Anterior gonopods consisting of broad, simple plates, rounded at tip, without prominent projections from the posterior side . . . . . *montivaga* spec. nov.
- Anterior gonopods more complicated, acute or various at tip or, if a broad plate, with one or more prominences on the posterior face, as in the next species . . . . .
- Males with joint 4 of the fourth legs not lobed, a lobe present on the fourth joint of the seventh legs . . . . . *vaga* Loomis
- Males with a lobed fourth joint on the fourth legs but never on the seventh legs . . . . .

- Males with a lobe on the fourth joint of the fourth legs only.  
*atrolineata* (Bollman)
- Males with fourth joint lobed on more than one pair of legs. . . . .
- Males with a lobe on the fourth joint of legs 3, 4 and 5.  
*albertana* Chamberlin
- Males with a lobe on the fourth joint of only two pairs of legs. . . . .
- Males with a lobe on the fourth joint of legs 3 and 4 . . . . .*specus* Loomis
- Males with a lobe on the fourth joint of legs 4 and 5.  
*fischeri* Cook & Collins

*Species of which only females are known*

- Eyes composed of 16 ocelli; posterior margin of segment 1 convex.  
*wyandotte* (Bollman)
- Ocelli more numerous; posterior margin of segment 1 straight or concave. . . . .
- Body only 10 mm. long; ocelli 19. . . . .*glomerata* (Harger)
- Body considerably longer; ocelli 22 to 24. . . . .
- Body 14 mm. long; gnathochilarium with a quadrangular mentum and a moderately large promentum . . . . .*leibergi* Cook & Collins
- Body over 20 mm. long; gnathochilarium with a semicircular mentum and a minute promentum. . . . .*coloradensis* Chamberlin

CONOTYLA VAGA Loomis

One mature male and several females and immature males, A-4894, "on boards at the landing", Alexander Caverns, near Naginey, Mifflin Co., Penna., Aug. 20, 1939; other young specimens, A-5019, apparently of this species from Arch Spring Cave, 7.5 miles southwest of Water Street, Blair Co., Penna., Aug. 21, 1939.

CONOTYLA SPECUS Loomis

Many specimens, A-5399, from North Rankin Cave., 4 miles east of Eureka, St. Louis Co., Missouri, Feb. 11, 1940; two mature females and several young, A-5397, from South Rankin Cave, 4 miles east of Eureka, Missouri, Feb. 11, 1940; several males and females, A-5386, from Meramec Caverns, 2.5 miles southeast of Stanton, Franklin Co., Missouri, Dec. 16, 1939; a half dozen specimens, A-4634, from Morrison's Cave, 2 miles south of Burksville, Monroe Co., Illinois, Aug. 28, 1939; two young, A-4671, from Stemmler's Cave, 2 miles south of Bluffsides, St. Clair Co., Illinois, Oct. 9, 1939.

## CONOTYLA MONTIVAGA spec. nov.

Nearly a score of specimens, including the male type, from 7500 feet elevation, Santa Rita Mts., Arizona, Oct. 29, 1927; many specimens from Santa Catalina Mts., Arizona April 23, 1921; several specimens from Mescalero, New Mexico, May 8, 1931; all collections by H. F. Loomis.

*Diagnosis.* Closely related to *C. specus* but in lateral view the gonopods are seen to be materially different in the two species.

*Description.* Length 9 to 13 mm.; pigmentation weak, much as that in *C. specus*.

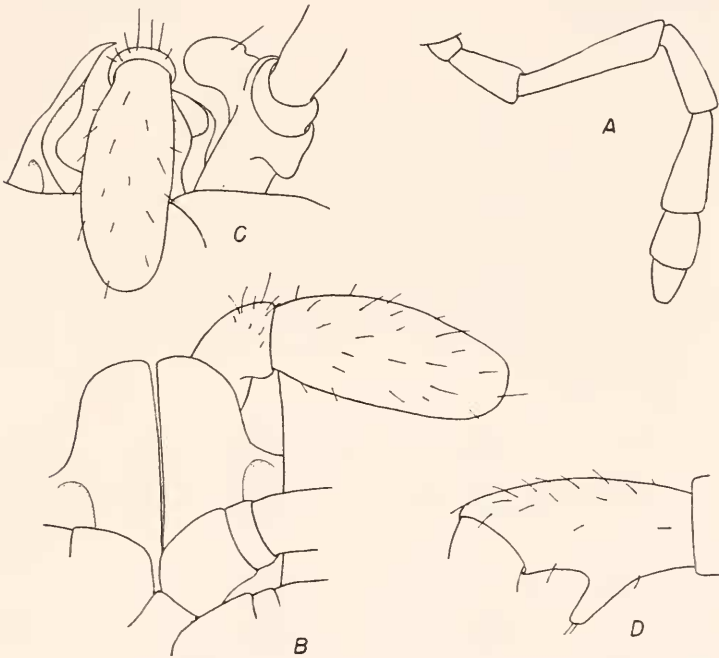


Fig. 4. *Conotylo montivaga*. a, Antenna; b, Gonopods and ninth leg of male, anterior view; c, Gonopod, ninth leg and basal joints of tenth leg, lateral view; d, Fourth joint of leg three of male.

Head with ocelli in four or five series in a subtriangular group, 3, 5, 6, 7 or 1, 3, 5, 6, 6; antennae rather short and stout as shown in figure 4, a; gnathochilarium with a small but definite triangular promentum which, however, is larger than that in *C. specus*.

Segments with lateral carinae not becoming apparent until on the fourth or fifth segment and completely lacking from the last half dozen segments; on the mid-body segments the carinae are represented by rounded shoulders very much less prominent than those of *C. humerosa*.

Gonopods as shown in figure 4, *b* and *c*; both anterior and posterior gonopods show the close relationship with *C. specus* although they exhibit obvious differences.

Males with a long slender lobe on the under side of the fourth joint of legs 3 and 4 as shown in figure 4, *d*; last joint of legs 3 to 7 granular-tuberculate beneath; tenth legs with a very large knob-like lobe on the front face of each coxa projecting under the gonopods when the legs are in normal position.

#### CONOTYLA HUMEROSA spec. nov.

About a dozen specimens, including the male type, collected "on mine props throughout Sunnyside Mine, 100 to 900 feet from entrance of mine, Jan. 22, 1923, 3 miles southwest of Seneca, Plumas Co., Calif." by H. S. Barber.

*Diagnosis.* Differing from other members of the genus in the much larger lateral carinae of the segments; the reduced number of ocelli; the very long and slender antennae; and the complete lack of color, the latter three characters being taken as indications that the species is a true cave form.

*Description.* Body without color; length from 17 to 21 mm.

Head with 7 to 10 ocelli in an elongate group on each side, mostly in two horizontal series as 4-3, 4-4, or with one or two ocelli opposite the posterior end of the interval between the two series of ocelli; antennae very long, capable of reaching nearly to the posterior margin of segment 5, and very slender as shown in figure 5, *a*; gnathochilarium with a small but definite triangular promentum.

First segment with front margin very strongly rounded, posterior margin transverse; segment longer than a semi-circle, the proportion of width to length being 8 to 5.

Beginning with the second segment the lateral carinae increase in size to about segment 6, from which to about segment 20 they are especially prominent and are definitely elevated to the level of the dorsum and, when viewed from above, cause the segments to bear considerable resemblance to those of *Polydesmus*; behind segment 20 the carinae decrease in size to about segment 25 or 26 after which they no longer are apparent; surface of segments shining; dorsal setae in

usual places, one at each corner of the lateral carina and one, borne on a small tubercle, at the anterior end of the depression formed between the lateral carina and the dorsum.

Male gonopods with the principal joint ending in a sharply decurved hook, preceded at base by a shorter, stouter, conic lobe; mesial edge of this joint lacinate, with 4 or 5 long and slender, ensiform processes directed forward as shown in figure 5, *b* and *c*.

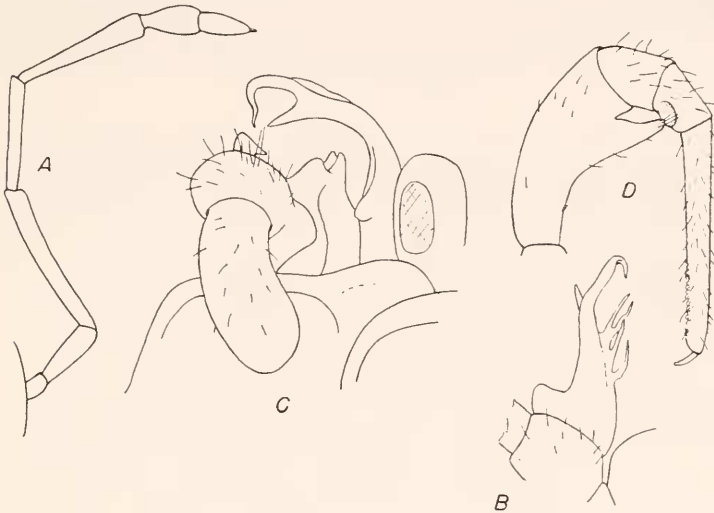


Fig. 5. *Conotyia humerosa*. *a*, Antenna; *b*, Gonopod, anterior view; *c*, Gonopod and ninth leg of male, lateral view; *d*, Four distal joints of leg 6 of male, posterior view.

First and second legs of male with a comb of fine hairs beneath the outer joint; coxae of second legs with a prominent, sub-conic inner corner; other joints of these legs unmodified; legs 3 to 7 with the last joint gradually tuberculate on the under side of the outer half, the coxae of these legs normal; legs 5 to 7 with the fourth joint bearing a conic lobe on the inner apical fourth; on leg 6 the apex of this lobe is received in a cavity in the inner face of joint 6 as shown in figure 5, *d*; the two-jointed ninth legs have the outer joint of the usual shape but smaller than usual for the genus; tenth legs with the lobe at the base of the third joint on the posterior side short, conic, smaller than the lobe in *C. fischeri*, and directed meso-caudad.

## SCOTERPES COPEI (Packard)

One female, A-4971, Ruby Falls Cave, near Chattanooga, Hamilton Co., Tenn., Aug. 7, 1939; 3 specimens, A-5027, Gregory's Cave, Cades Cove, Great Smokey Mts. National Park, Sevier Co., Tenn., Aug. 9, 1939; 4 specimens, A-4912, White's Cave, near Mammoth Cave postoffice, Edmonson Co., Ky., Aug. 30, 1939; 1 specimen, A-4917, near Richardson's Spring, Mammoth Cave, Edmonson Co., Ky., Aug. 30, 1939.

## SCOTERPES AUSTRINUS spec. nov.

## Plate 1, figures 1 and 2

Three males, one the type, and four females, A-5003, from Manitou Cave, 1 mile south of Ft. Payne, DeKalb Co., Alabama, Aug. 4, 1939; 12 specimens, A-5001, from Saltpeter Cave, four miles south of Kingston, Bartow Co., Ga., Aug. 4, 1939.

*Diagnosis.* Although closely related to *S. copei* (Packard) the size is larger and the gonopods are materially different.

*Description.* Length 9 to 10.5 mm., a young distended male 12 mm. long; body without pigmentation.

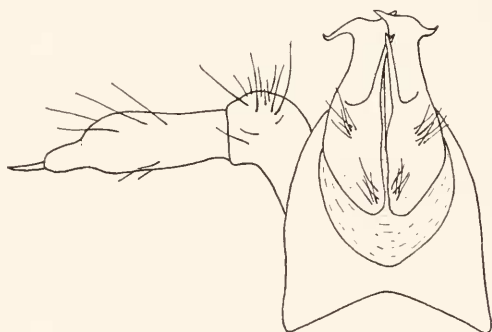


Fig. 6. *Scoterpes austrinus*. Gonopods and ninth leg of male, anterior view.

Segments with dorsal rows of setae closer together than in *S. copei*, the two rows of the first segment separated by a distance not greater than two-thirds the length of one row; on ensuing segments the intervals correspondingly narrower than in *S. copei*; the ridges bearing the setae are slightly higher and the outer shoulder more prominent than in that species.

Preanal scale semi-circular, the posterior margin evenly rounded.

Gonopods and ninth legs of male as shown in figure 6. In the males from Saltpeter Cave in Georgia the ninth legs are shaped the same as in specimens from Alabama but lack the terminal claw.

Third and fourth male legs slightly more crassate than adjoining legs; none of the legs in front of the gonopods have special swellings or tubercules on the ventral face of the joints but on legs 3, 4 and 5 the last joint is conspicuously more setose beneath than on the two pairs of legs on either side, with a somewhat more dense, almost brush-like, group of hairs at the tip beneath the claw.

#### SCOTERPES DENDROPUS Loomis

A female, A-5165, collected in Old Spanish Cave, 8 miles east of Galina, Stone Co., Mo., Oct. 21, 1939.

#### ZYGONOPUS WHITEI Ryder

A score of specimens, A-5026, from Shenandoah Caverns, 4.5 miles south of Mt. Jackson, Shenandoah Co., Va., Aug. 13, 1939; 6 specimens, A-5000, from Luray Caverns, Luray, Page Co., Va., Aug. 14, 1939.

#### RHISCOSOMIDIDAE

##### TINGUPA PALLIDA Loomis

A score of specimens, A-5655, from type locality, River Cave, Hahatunka, Camden Co., Mo., Aug. 4, 1940; other specimens are from the following Missouri localities—A-5070, Missouri Caverns, 5 miles southeast of Leasburg, Crawford Co., Oct. 8, 1939; A-5381, Indian Ford Cave, 2 miles east of Vienna, Maries Co., Dec. 15, 1939; A-5548, Holmes Cave, 4.5 miles east of Patterson, Wayne Co., June 9, 1940; A-5589, Bat Cave, 7 miles northeast of Success, Texas Co., July 5, 1940; A-5628, Onyx Cave, on bluff above Brazil Creek, 3 miles north of Campbell Bridge, 8 miles southeast of Bourbon, Crawford Co., July 28, 1940; A-5663, Flanders Cave, 2.5 miles south of Aurora Springs, Miller Co., Aug. 4, 1940; A-5675, Bat Cave, 5 miles south of Crocker, Pulaski Co., Aug. 17, 1940.

One of the posterior gonopods is shown in oblique lateral view in figure 7. The complete gonopods were shown in anterior view in Bull.

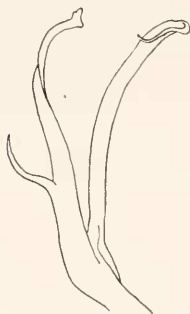


Fig. 7. *Tingupa pallida*. Posterior gonopod, anterior view.

Mus. Comp. Zoöl., Vol. 86, No. 4, p. 186, Fig. 12 b, 1939, but in that figure only the tips of the posterior gonopods are visible.

## LYSIOPETALIDAE

### SPIROSTREPHON MAGNUM spec. nov.

The mature male type, two other mature males, a female and several young A-5054, collected in Monte Sano State Park, east of Huntsville, Madison Co., Alabama, July 22, 1939.

*Diagnosis.* Exceeding in size of body and number of primary crests on the posterior segments the other species of the genus. The gonopods also are definitely different.

*Description.* Body from 40 to 50 mm. long and to 3.5 mm. broad, the males conspicuously broader and flatter than the rather small female which, however, appears to be fully mature; number of segments 57 to 59; color rather dark brown, a lighter median stripe extending the length of the body.

Head definitely granular in front below the level of the antennae which have joint 3 slightly longer than joint 2, an unusual condition in this family; ocelli black, in a triangular patch, numbering 43 to 52.

First segment with only 18 conspicuous crests on the posterior half.

On ensuing segments the primary and secondary crests are approximate in size, the total number of crests inconstant through reduc-



tion of the normal number of additions thereto, which make it impossible to determine with exactness the point of transition from the anterior segment crests to the full complement of the mid-body region, although this transition appears to take place at about segment 12 as with two of the other species in which the transition has been noted. Differing from other members of the genus and even of the family in the increase over the normal number of crests of the primary and secondary crests on the posterior segments where both classes of crests are readily distinguished, especially since only the primary crests

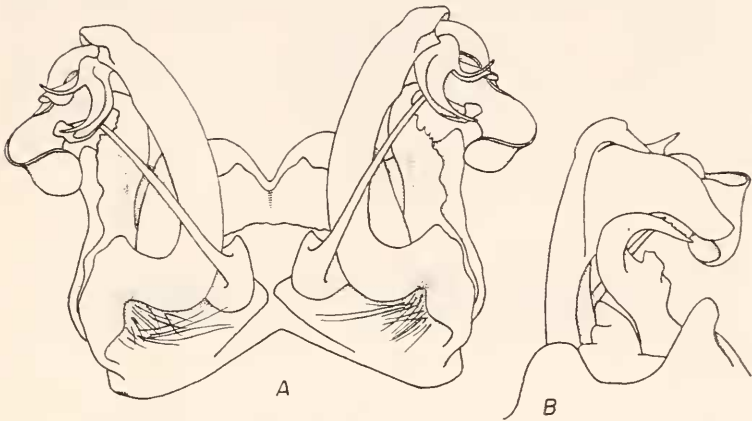


Fig. 8. *Spirostrephon magnum*. a, Gonopods, anterior view; b, Gonopod, outer lateral view.

have a posterior seta; on from 8 to 12 segments preceding the anal segment there are consistently four primary and five secondary crests between the median line and the poriferous keel on either side of the body whereas the customary number for other species is three primary and four secondary crests although increased numbers may at times be found which are not constant for the species; all dorsal crests are slender, moderately elevated with apex smooth and shining, the lower sides and intervals between the crests finely granular; pore area occupying the anterior half of the keels at the front of the body but becoming more extensive farther back, eventually occupying the entire outer margin; below the poriferous keels are two high crests, much more prominent than the dorsal primary crests, and these are to be seen in dorsal view, each terminating in a sharp, slightly produced,

upturned angle; much lower crests are present ventrad of these two high crests.

Male gonopods as shown in figure 8, *a* and *b*, having the subapical structure on each side with four branches; laterad of the main armature a prominent, stout, uncate process is elevated beneath the principal curved, spatulate arm.

Females with a comb of fine setae beneath the outer joint of the first three pairs of legs.

Males with first and second legs little more than half as large as the third legs, each with a comb of setae beneath the outer joint; a spongy pad present on the disto-ventral half of the outer joint of legs 3 and 4, similar pads, decreasing in size, are present on the ensuing nine or ten pairs of legs; coxae and ventral face of the third and fourth joints of the legs from the fourth pair to near the posterior end of the body finely velutinous except that on the fourth joint this condition does not extend beyond the legs at the middle of the body.

#### SPIROSTREPHON sp.

A young specimen, A-4933, from Sneed's Spring Cave, Sharp's Cove, 8 miles northeast of Marysville, Madison Co., Alabama, July 23, 1939.

### CAMBALIDAE

#### CAMBALA CRISTULA Loomis

Many specimens, A-5033, from Kymulga Cave, 7 miles northeast of Childersburg, Talladaga Co., Alabama, July 18, 1939; many specimens, A-5008, from Florida Caverns, north of Marianna, Jackson Co., Florida, July 29, 1939.

One male in the Florida collection has a very unusual abnormality, never before observed, in that following the sixth segment there are two legless segments, each with a typical aperture for the gonopods and each containing what appears to be a complete and normal set of gonopods.

#### CAMBALA MINOR (Bollman)

Nearly a dozen specimens, A-5368, from Cellar Cave, Zell, Genevieve Co., Missouri, Dec. 9, 1939; many specimens, A-5411, from cave on bluff one half mile north of Fults, Munroe Co., Illinois, Mar. 31, 1940.

## CHOCTELLA CUMMINSI Chamberlin

Psyche, 25, 2, p. 25, 1918.

Examination of a paratype male in the Museum of Comparative Zoölogy resulted in several interesting discoveries. The stipes of the gnathochilarium, which is shown in figure 9, *a*, each have, on the anterior third, an oblique rectangular elevated area with a large perforation distally, the remaining surface coarsely roughened as if densely punctate, the rest of the stipe and other parts of the gnathochilarium

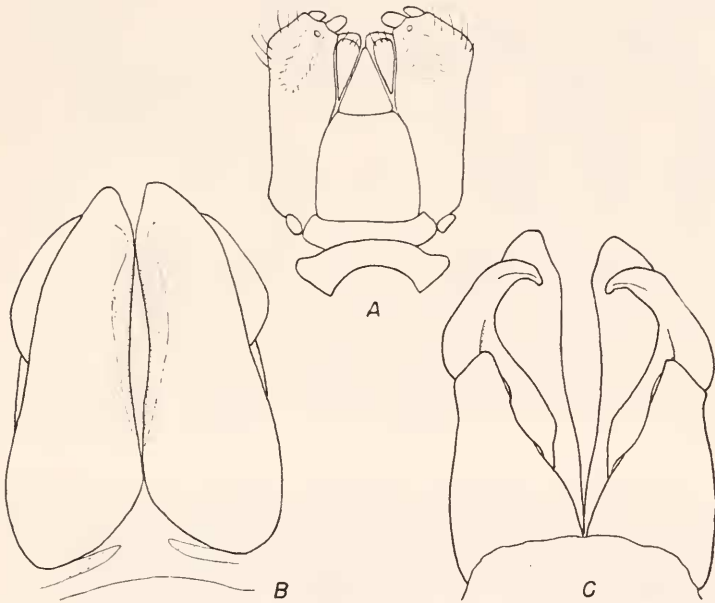


Fig. 9. *Choctella cumminsi*. *a*, Gnathochilarium; *b*, Gonopods, anterior view; *c*, Gonopods, posterior view.

smooth and shining. The pores are as described on all but the caudal segments where the pore is in line with the sulcus or even behind it, with the sulcus interrupted opposite the pore. An important generic character previously unmentioned is the complete absence of a preanal scale. Gonopods as shown in figure 9, *b* and *c*. Seventh segment of the male deeply and widely excised from in front ventrally, the median ventral suture behind it widely open with the slender portion of the segment on either side ending in a rather large globular, semi-membranous body.

## CAMBALOPSIDAE

## TITSONA SIMA Chamberlin

Ann. Ent. Soc. Amer., 5, 2, p. 160, 1912.

In the collection of the Museum of Comparative Zoölogy are a score of specimens from Yolo County, California, collected Feb. 28, 1914 by L. Childs and identified as this species by R. V. Chamberlin. The largest specimen is a male with 52 segments. The gnathochilarium has an undivided mentum, as shown in figure 10, *a*, quite contrary to

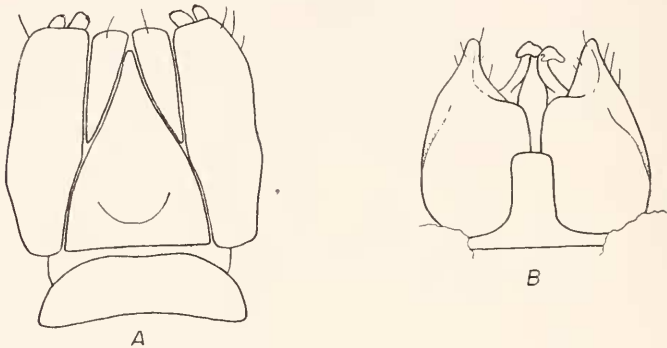


Fig. 10. *Titsona sima*. *a*, Gnathochilarium; *b*, Anterior conopods, anterior view.

the statement in the original description. Thus, although the type specimen has not been seen, on Chamberlin's identification of the Yolo specimens it seems that the genus must be removed from the Cambalidae and relocated in the Cambalopsidae in close association with *Endere*.

As stated in the specific description, the gonopods are much reduced in size. They are rather poorly chitinized and of the form shown in figure 10, *b*. In other particulars the Yolo specimens agree with the original description.

## PARAIULIDAE

## PARAIULUS sp.

One female, A-4674, from Stemmler's Cave, 2 miles south of Bluffside, St. Clair Co., Illinois, Oct. 9, 1938.

## A new family of the order

## ZYGOCHEETA

If one were to use Attems' interpretation of the family Blaniulidae, as presented in Kukenthal's "Handbuch der Zoologie" Vol. 4, pp. 182-5, 1926, it would be found that the genus hereafter described under the name *Zosteractis* should be included there. However, outstanding characters of this genus would exclude it from any of the three established subfamilies, the Blaniulinae, Paraiulinae or Uroblaniulinae, as the two pairs of gonopods differ in size, the anterior ones being long and slender, in remarkable contrast to the short and thick posterior ones. In Attems' subfamilies the gonopods are similar in size, both pairs being either long and slender or short and thick. Adherence to his classification system would require that *Zosteractis* be made the type of a fourth subfamily but not everyone will accept his proposal that such structurally diverse groups as the iulids, paraiulids, spirobolids, spirostreptids and cambalids be associated in a single order. Instead it is thought more reasonable to use a somewhat older classification which recognizes the diversities of these groups by placing them in three orders, the Zygocheta, Anocheta and Diplocheta. Under this seemingly more natural arrangement the genus *Zosteractis* is proposed as the type of a new family of the Zygocheta, ranking with the Iulidae, Paraiulidae, Blaniulidae, etc., with relationship closest to the last named family.

## ZOSTERACTIIDAE fam. nov.

Body slender, submoniliform, the segments constricted in front of the middle, the posterior portion noticeably convex; each segment from the first to the last inclusive with a series of erect setae along the posterior margin.

Head eyeless; with two setae on the vertex; antennae rather stout; mandibular combs four.

Segments with pores well behind the transverse constriction.

Legs slender, not projecting beyond sides of body; claw long and attenuated; first two pairs of legs with sterna free, sterna of all other legs coalesced.

Anterior gonopods long and slender, projecting far outside of the body; the posterior pair short and thick, contained within the body; flagella apparently present but either reduced in size or broken.

First pair of male legs five-jointed but greatly reduced in size, the outer joints modified.

ZOSTERACTIS gen. nov.

Body long and slender, with a high but indeterminate number of segments; all the apparently mature specimens have three legless segments at the posterior end of the body, possibly a degenerate condition induced by cave life; pigmentation dilute.

Head hemispherical, eyeless; vertex smooth, without a median furrow but with two widely separated setae; clypeal setae 4; labral setae 16; antennae rather short and stout; females with mandibular stipes subtriangular, those of the males larger, subquadrangular, having a lower anterior corner produced forward into an angularly rounded lobe.

Segments from the first to the last inclusive with a series of from 10 to 24 long erect setae along the posterior margin, the number of setae increasing from front to back of body, the series beginning considerably below the pores on the leg-bearing segments but almost completely encircling the legless ones preceding the anal segment; segments with a strong but broad and indefinite constriction in front of the middle; the surface of the prozonite reticulated; surface of the metazonite smooth, shining and noticeably convex, a few sublateral striations present; pores small, beginning on segment 6.

Last segment slightly surpassing the anal valves, the apex broadly rounded; dorsum with three transverse rows of erect setae.

Anal valves evenly inflated, meeting at a reentrant angle; two long setae on each valve near the opening; preanal scale elliptical, with two long setae near the posterior margin.

Legs rather small and weak, not extending beyond the sides of the body; claws very slender and long, equalling the last joint in length.

Gonopods greatly differing in size; the anterior ones long, slender and projecting far outside the body; the posterior ones short, stout and almost completely hidden within the body.

Males with the first pair of legs much reduced in size, with a coxal joint and four outer joints, the penultimate of which is greatly modified; second legs of normal size and shape.

Females with first two pairs of legs slightly more crassate than the ensuing legs.

Type. *Z. interminata* spec. nov.

*ZOSTERACTIS INTERMINATA* spec. nov.

Three males, one the type, and three females, A-6394, Jan. 25, 1942 and one female and the anterior end of a male, A-5398, Feb. 11, 1940, from South Rankin Cave, 4 miles east of Eureka, St. Louis Co., Missouri; one female, A-5369, from Cellar Cave, Zell, Ste. Genevieve Co., Missouri, Dec. 9, 1939.

Length 15 to 23 mm., width 0.5 to 0.7 mm. Number of segments variable, the three males with 64, 67 and 81 segments, the four females with 57, 58, 64 and 65 segments; all specimens with the last three segments legless; another female with 52 segments has four legless caudal segments. Living color apparently quite dilute as in specimens received only 5 days after collection the anterior end of the body was light pink, changing to uniform light transparent brown at the middle of the body and behind; repugnatorial glands showing as dark areas through the body wall; specimens preserved a year had lost any color that had been present.

Head reticulated behind the two widely separated setae on the vertex, the entire surface in front of them smooth and shining; antennae rather short and stout as shown in figure 11, *a*; joints 3 and 6 subequal in length and longer than subequal joints 2, 4 and 5; joint 5 thickest; eyes absent; gnathochilarium as shown in figure 11, *b*.

First segment about as long as the next two segments together; front margin broadly rounded at middle, slightly emarginate on each side behind the mandibulatory stipe; lateral angle quite acute, the posterior margin proceeding straight upward from it; a series of 10 to 12 erect setae just in front of the posterior margin; surface in each lateral angle with two or three short striae beginning at the emargination.

Ensuing segments with the erect setae along the posterior margin longer on the first and last few segments than on the intervening ones where there are about 16 setae on each segment but on the legless antepenultimate and the penultimate segments there are about 24 setae almost encircling the segments; pores small, surface below them with 5 to 8 lateral striae more prominent on the anterior segments.

Last segment with the dorsum about twice as long as the two foregoing segments together; erect setae longer than elsewhere on body, in three transverse series, 10 setae in the anterior row, 6 in the middle row and 12 in the posterior marginal series.

A leg from the middle of the body, with the typical long and slender claw, is shown in figure 11, *c*.

Gonopods with the anterior pair projecting far outside the body, as shown in figure 11, *d*, extending backward along the ventral surface

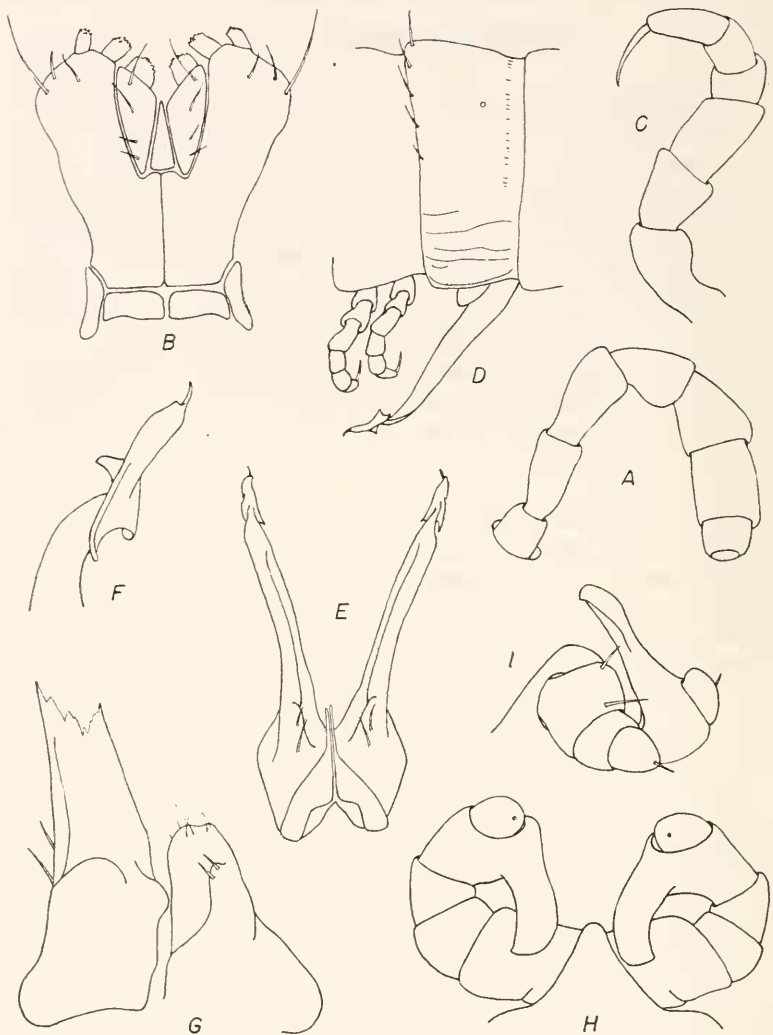


Fig. 11. *Zosteractis interminata*. a, Antenna; b, Gnathochilarium; c, Leg from middle of body; d, Segments 6, 7 and 8 in lateral view showing the protruding anterior gonopods and the two pairs of legs of segment 8; e, Gonopods, anterior view; f, Tip of anterior gonopod; g, Posterior gonopod and base of anterior gonopod, lateral view; h, First legs of male, anterior view; i, First leg of male, oblique lateral view.



with the tips reaching to the coxae of the fourth pair of normal legs behind them; other views of these gonopods are shown in figure 11, *e* and *f*; posterior gonopods short and stout, as shown in figure 11, *g*, and concealed within the body when the anterior pair are in normal position.

First pair of male legs greatly reduced in size and modified as shown in figure 11, *h* and *i*.

First and second pairs of female legs noticeably stouter than ensuing legs.

## NEMASOMIDAE

### NEMASOMA SAYANUM Bollman

Bull. U. S. Nat. Mus., No. 6, p. 145, 1893.

*Julus punctatus* Say. Jour. Acad. Nat. Sci. Phila., 2, 102, 1821.

*Julus stigmatosus* Brandt. Recueil, p. 88, 1841.

A male and two females, A-5043, all lacking one or two moults of maturity, collected on "The Loop," 10 miles south of Gatlinburg, Sevier Co., Tenn., Aug. 10, 1939.

## SPIROBOLIDAE

### ARCTOBOLUS MARGINATUS (Say)

Although this is one of the most widely recorded North American millipeds its range has not been fully and accurately determined on the

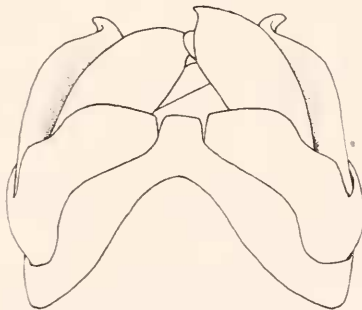


Fig. 12. *Arctobolus marginatus*. Gonopods, anterior view.

basis of recent knowledge of the species. It is probable that some of the southern records of this species actually refer to *A. dolleyi*, a species hereafter described.

For purposes of comparison with that and other species the gonopods of a specimen of *A. marginatus* from Maryland are shown in anterior view in figure 12.

ARCTOBOLUS SPINIGERUS (Wood)

*Spirobolus spinigerus* Wood. Proc. Phila. Acad. Nat. Sci., p. 15, 1864.

*Spirobolus paludis* Chamberlin. Ann. Ent. Soc. Amer., **11**, 374, 1918.

Specimens of this species from Key West, Florida to as far north as South Carolina have been examined. It is one of the few species commonly found in the vicinity of Miami, Florida, where it frequently may be seen crawling across the country roads at almost any time of the year. Examination of the gonopods and other structural features of the type of *S. paludis*, in the Museum of Comparative Zoölogy, leaves no doubt that it is a synonym of *A. spinigerus*.

ARCTOBOLUS DOLLEYI spec. nov.

This species is named for Mr. John S. Dolley who sent me specimens from the following Mississippi localities in 1937; 22 specimens, including the male type, Feemster's Lake area near Tupelo, Lee Co., May 10; 10 specimens, 3 miles north of Tupelo, May 5; 21 specimens, 3½ miles northeast of Shannon, in Town Creek bottom, Lee Co., (no date); 2 specimens, 3 miles southeast of Vernon, Pontotoc Co., March 31; 3 specimens, 9 miles southeast of Pontotoc, Pontotoc Co., April 26; 1 specimen, Jack Fontaine farm, 2 miles south of Pontotoc, May 26. Leslie Hubricht collected 3 males, A-5057, in Monte Sano State Park, east of Huntsville, Madison Co., Alabama, July 22, 1939.

*Diagnosis.* This is a larger species than *A. marginatus*, the pores are further removed from the transverse sulcus and there are differences shown by the gonopods and coxal lobes of the pregenital legs.

*Description.* Size from 80 to 120 mm. long and from 7.5 to 10 mm. in diameter; number of segments 51 to 61.

In life the surface of the body is dully shining, the posterior portion of each segment more shining than the anterior portion; head with clypeal region light brown, gradually darkening to almost black on the vertex; first segment surrounded by a dark red band, widest in front and narrowest at the lateral angles, the median area almost black; segments black in front of the transverse constriction, nearly dark brick red behind it; last segment red at apex only; anal valves with margins

red; antennae and outer joints of the legs purplish pink, the basal joints of the legs yellowish.

Head with median furrow of vertex short but deep, that of the frontal area longer and deeper, the two widely separated; clypeus usually with 5 fovea on each side but sometimes with only 4; ocelli at times in 5 series but usually in 6 series, the total number of ocelli from 36 to 44; antennae with joint 2 considerably longer than any other joint.

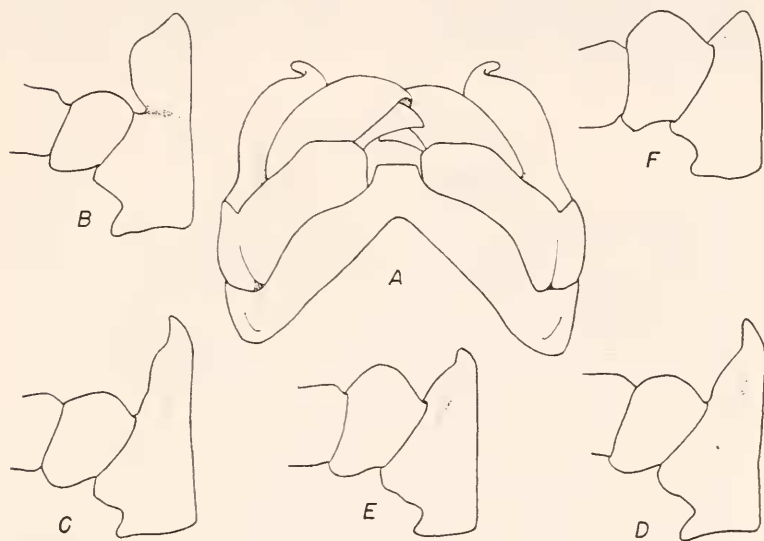


Fig. 13. *Arctobolus dolleyi*. a, Gonopods, anterior view; b, c, d, e, and f, Basal joints of male legs 3, 4, 5, 6 and 7 respectively.

First segment with the anterior margin on each side usually shallowly emarginate just back of the antennae.

On ensuing segments the suture between mid- and hind-belts is impressed throughout its length from the feet across the dorsum; mid-belt flat or even slightly concave, densely and coarsely punctured; hind-belt slightly convex with smaller but almost as numerous punctures as on the mid-belt; pores well in front of the suture which bends forward behind the pore, at times only just touching the smooth area surrounding the pore.

Last segment very finely punctured except at apex where the punc-

tures are coarser but not as coarse as on segments farther forward. Anal valves minutely punctured on the sides with a few coarse punctures near the thickened margins which, however, are almost free of them and are strongly shining.

Gonopods as shown in figure 13, *a*. Males with coxal lobes of third legs swollen, shaped as shown in figure 13, *b*; coxal lobes of next three pairs of legs thinner, shaped as shown in figure 13, *c*, *d* and *e*, with tip of each usually strongly chitinized; coxal lobes of seventh legs thicker, the tips seldom specially chitinized, shape as shown in figure 13, *f*; third joint of legs 6 and 7 greatly compressed from front to back, the posterior face deeply concave.

## DESMONIDAE

### DESMONIELLA gen. nov.

*Diagnosis.* Distinguished by having only 19 segments and with their surface entirely smooth although minutely hispid; body without pigmentation; second segment with lateral carinae much more produced than in *Desmonus*, extending downward as far as does the large third segment and much surpassing the first segment; pits of the anterior basal margin of the lateral carinae found only on segments 4 to 10 inclusive, instead of extending much farther back as in *Desmonus*.

*Description.* Body of the proportions of *Desmonus* although the size smaller and the body composed of only 19 segments; surface of segments lacking irregularities but sparsely and very minutely hispid and with segments 1 and 2 with several additional long setae.

Second segment with lateral carinae much more produced than in *Desmonus*, greatly surpassing the lower limits of the first segment and reaching as low as does the third segment.

Third segment largest of all but relatively smaller than that in *Desmonus*, the lower limits of the carinae subtruncate rather than progressing in a curve to the acute posterior corner as in that genus.

Segment 4 not appreciably larger or otherwise different from immediately ensuing segments; the peculiar pits, characteristic of this family and located on the front of the segments at the base of the carinae, begin on segment 4 and are continuous only to segment 10 beyond which they are absent.

Last segment large and hoodlike and of the same shape as in *Desmonus*.

Gonopods showing obvious relationship to *Desmonus*.

Type. *D. curta* spec. nov.

## DESMONIELLA CURTA spec. nov.

## Plate 1, figure 3

About ten specimens, A-5489, including the male type, from Arbuckle Mts., 2.3 miles south of Fittstown, Pontotoc Co., Oklahoma, May 22, 1940.

Maximum length from 5.5 to 6 mm.; body without color; surface shining but magnification shows a very few minute setae apparently restricted to the posterior portion of the segments; segments 1 and 2

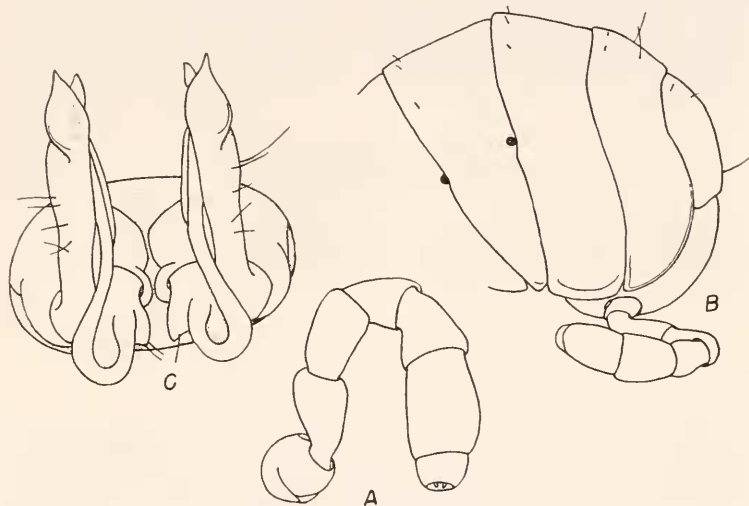


Fig. 14. *Desmonia curta*. a, Antenna; b, Head and first four segments, lateral view; c, Gonopods, anterior view.

have several long setae in addition to the very minute ones; antennae and anterior end of the body as shown in figure 14, a and b.

Gonopods as shown in figure 14, c.

Other characters of possibly only specific importance are given in the generic description.

## XYSTODESMIDAE

## FONTARIA Gray

*Zinaria* Chamberlin. Bull. Univ. Utah, **30**, 2, p. 4, 1939.

Chamberlin's inclusion of *virginiensis* (Drury) in his proposed *Zinaria* immediately invalidates that genus as *virginiensis* is the type of the genus *Fontaria*.

## FONTARIA BRUNNEA (Bollman)

*Fontaria virginicensis brunnea* Bollman. Am. Nat., **21**, 82, 1887.

*Zinaria urbana* Chamberlin. Bull. Univ. Utah, **30**, 2, p. 5, 1939.

In the U. S. National Museum is one of Bollman's specimens from Madison, Wisconsin bearing the catalog number 294 and identified seemingly by Bollman, as a male of *Fontaria virginicensis brunnea*. A drawing made by the writer several years ago from this specimen shows one of the gonopods which is similar to Chamberlin's drawing of *urbana*. Other specimens of *brunnea*, identified by Bollman, are in the Museum collection received from Fort Snelling, Minn., apparently after his last published reference to the species. Also there is a male from Chicago, Ill. Although I was unable to locate the type specimen the other specimens from Fort Snelling, which was the type locality of *brunnea*, agreed with the specimens from Wisconsin. On the basis of comparison of the above specimens with Bollman's and Chamberlin's very brief descriptions cited above it seems that but a single species is involved and the older name, although proposed as a varietal designation, must be recognized.

## MIMULORIA GEORGIANA (Bollman)

*M. ducilla* Chamberlin. Bull. Univ. Utah, **30**, 2, p. 7, 1939.

Comparison of a drawing of the gonopods and general notes on Bollman's type specimen in the U. S. National Museum with Chamberlin's description and drawing of *ducilla* indicates the above synonymy.

Numerous specimens were collected by Leslie Hubricht as follows: Monte Sano State Park, east of Huntsville, Madison Co., Alabama, July 22, 1939, A-4505; under logs, Newfound Gap, Great Smokey Mts. National Park, Swain Co., North Carolina-Sevier Co., Tenn. Aug. 10, 1939, A-5006; 3 females, A-5079, apparently this species, Torreya State Park, Liberty Co., Florida, July 29, 1939.

## CLEPTORIA RILEYI (Bollman)

*C. macra* Chamberlin. Bull. Univ. Utah, **30**, 2, p. 9, 1939.

Having seen Bollman's type of *rileyi* and made drawings of the gonopods it appears that Chamberlin's *macra* is a synonym of *rileyi* which would thus become the type of *Cleptoria* if that genus is to be accepted. Although I am not fully assured on this genus the name is used in the binomial for the present.

## PACHYDESMUS RETRORSUS Chamberlin

Three males and two females, A-5056, collected in Monte Sano State Park, east of Huntsville, Madison Co., Alabama, July 22, 1939.

## EURYURIDAE

With the recent establishment of the genus *Auturus* by Chamberlin (Bull. Univ. Utah, Vol. 32, No. 8, p. 7, 1942) two species which previously had been included in *Euryurus* were transferred to the new genus. As given in the present paper the genus *Euryurus* is composed of the type species, another species elevated from varietal rank, and a third species described as new.

## EURYURUS ERYTHROPYGUS (Brandt)

Many specimens, A-5032, from Shelta Cave, 1 mile north of Huntsville, Madison Co., Alabama, Aug. 5, 1939.

This species has the two terminal prongs of the gonopods slender, pointed, and subequal in length; the posterior margin of the keels is serrate-erose, as in *E. falcipes*.

## EURYURUS AUSTRALIS (Bollman)

*Euryurus erythropygus australis* Bollman. Proc. U. S. Nat. Mus., 11, 346, 1888.

On the basis of the form of the gonopods alone Bollman's subspecies is entitled to specific standing. It appears to be most closely related to *E. falcipes* but Bollman stated "Upper branch of copulation foot five times as long as the lower" whereas in *falcipes* the lower branch is much the longest.

*E. australis* has not been reported since it was described and the original specimen has not been seen, in recent years, in the National Museum collection although careful search there might reveal its presence.

## EURYURUS FALCIPES spec. nov.

The male type, another male and three females, A-5078, from Torreya State Park, Liberty Co., Florida, July 29, 1939.

Length 27 to 30 mm., the males shorter than the females but relatively broader and distinctly less convex with lateral carinae extending farther outward. None of the specimens appear to be fully colored, the darkest having the body light reddish brown with the margins of

the keels and a large spot at the middle of the posterior margin of each segment colorless.

In direct comparison with *erythropygus* this species has the body of similar proportions, not more slender as is said of *australis*; the antennae are slightly more slender; first segment a little shorter with outer angles more acute; lateral keels with a similar tooth at the anterior corner, the outer margin as thick or thicker and slightly irregular, sometimes with two or three denticules, especially on the non-porifer-



Fig. 15. *Euryurus falcipes*. Gonopod.

ous segments, the posterior margin of the keels somewhat more evidently serrate-dentate than in *erythropygus*: segments 2 to 18 inclusive with a considerable area on each side, adjacent to the legs, densely beset with small but pronounced granules, as in that species.

Last segment with the produced portion as wide or even wider (male type) at the apex than at the base.

Gonopods as shown in figure 15.

Males with the sternum of the third and fourth legs with a tiny conic tubercle on each side; in *erythropygus* these tubercles are entirely lacking or are exceedingly small.



## POLYDESMIDAE

## POLYDESMUS BRANNERI Bollman

## Plate 1, figure 4

Proc. U. S. Nat. Mus., 10, 620, 1887.

In 1887 Bollman reported a new species of milliped from Tennessee, giving it the above name. No technical description was presented, only a comparative diagnosis so brief and lacking in tangible details as to be almost valueless for systematic use. In subsequent remarks he stated that the most important differences between *P. branneri* and *P. serratus* Say, with which he compared it, were shown by the gono-

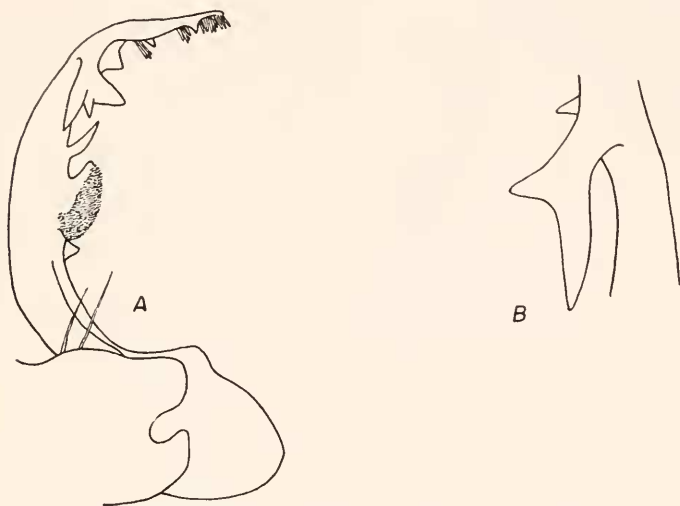


Fig. 16. *Polydesmus branneri*. a, Gonopod, lateral view showing the intermediate process trifid; b, Normal, bifid intermediate process.

pods but these differences were not described. Following the remarks was a short table giving several measurements of three specimens and containing the only exact data regarding the species. The type specimen was deposited in the U. S. National Museum collection but several attempts by the writer to locate it there have failed.

Bollman recorded this species from Tennessee and Georgia, and Chamberlin has recorded it from Knoxville, Tennessee without further

comment. Specimens are before me which, in view of their distribution and the form of their gonopods, I assume to be *P. branneri* and from them the following remarks have been prepared to aid future recognition of the species.

Males and usually female specimens have been examined from the following localities. Between Marshall and Hot Springs, N. C., Oct. 30, 1929, O. F. Cook; Etowah, Tenn., Nov. 4, 1929, O. F. Cook; Gatlinburg, Tenn., June 25, 1938, H. F. Loomis; Newfound Gap, Great Smokey Mts. National Park, Swain Co., N. C.—Sevier Co., Tenn., and from "The Loop", 10 miles south of Gatlinburg, Sevier Co., Tenn., Aug. 10, 1939, A-5007 & A-5039, Leslie Hubricht; Elk Garden Ridge, Jefferson National Forest, Va., Sept. 18, 1939, H. E. Ewing & A. B. Gurney.

Length 21 to 28 mm., the females apparently usually smaller than the males; dorsum flatter than in *serratus* and the outer margin of the keels less broadly rounded, the marginal teeth slightly more evident than in *serratus*; in other particulars the dorsum is not materially different from that species. Chief character for the separation of the two species is found in the gonopods; those of *branneri* having a prominent bifid arm on the outer side of each terminal joint half way between the fungiform tubercle and the apex; in *serratus* there is only a small angular lobe at this place. A gonopod of *branneri* is shown in figure 16, *a*, in which the intermediate arm is trifid although that on the opposite gonopod was of the normal bifid type shown in figure 16, *b*. The sterna of the fourth and fifth male legs are densely beset with long setae as in *serratus*; the prominent pair of large tubercles on the sterna of the sixth and ninth legs also are as in that species.

#### POLYDESMUS ERASUS spec. nov.

##### Plate 1, figure 5

The male type and three females, A-5053, from Monte Sano State Park, east of Huntsville, Madison Co., Alabama, July 22, 1939.

*Diagnosis.* Apparently closely related to *P. branneri* but of smaller size with somewhat less definite sculpturing and structural differences in the gonopods.

*Description.* Male and largest female each 22 mm. long, which is smaller than most specimens of *P. branneri*; the dorsum is slightly flatter and although its sculpturing is of the same general pattern it is less pronounced than in that species, the large tumid area at the base of the lateral keels in *P. branneri* being inconspicuous in *erasus*; in

general the posterior corners of corresponding keels are more acute and more produced than in *branneri* except on segments 17 to 19 inclusive, and on these segments the width of the posterior margin between the produced keels is greater in *erasus* than in *branneri*; lateral keels with outer margin less rounded than in *branneri* and with much smaller teeth, when teeth are present.

Gonopods as shown in figure 17; differing in several particulars from those of *branneri*; three triangular lobes or teeth are seen to be present along the inner side of the terminal joint in *erasus* but there are four

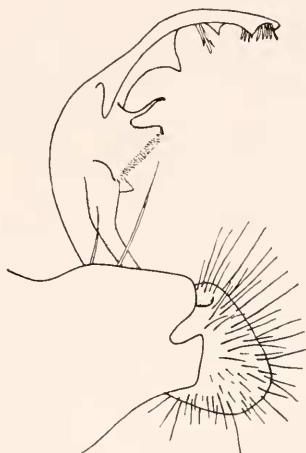


Fig. 17. *Polydesmus erasus*. Gonopod, lateral view.

such prominences in *branneri*, one of them being obscured in the illustration by the trifurcate (normally bifurcate) structure on the outer margin of the joint.

Sternum of the sixth male legs with a large tubercle on each side but these tubercles are much less hairy than those in *branneri*.

#### POLYDESMUS sp.

Five young specimens, A-5765, from Wildwood Cave, 1 mile south of Wildwood, Pulaski Co., Missouri, Sept. 21, 1940; one young specimen, A-5049, Monte Sano State Park, east of Huntsville, Madison Co., Alabama, (no date).

## ANTRIADESMUS gen. nov.

*Diagnosis.* Although males are not known it appears that this genus may be quite closely related to the tropical American *Cryptogonodesmus*. The most obvious differences from that genus are the greater number of setae in the three rows on each segment and the additional tooth on the outer margin of the keels.

*Description.* Size small, the body slender, about ten times as long as broad; composed of 20 segments; lacking pigmentation; dorsum strongly convex; lateral carinae narrow, scarcely exceeding the sides of the body.

Head subglobular, setose; as wide as the diameter of the body; the vertex without a median furrow; antennae long, submoniliform, joint 6 much exceeding the other joints in length and thickness.

Segment 1 considerably narrower than the ensuing segments or the head; almost semicircular, with the back margin slightly convex; a series of erect setae completely encircling the segment, there being about 14 setae behind the front margin and about 8 in advance of the back margin; central area of the segment with 10 or 12 scattered setae.

Ensuing segments with three transverse rows of setae on small and rather indistinct tubercles, there being about ten setae in each row; across the middle of each segment, between the first and second row of setae, is a broad distinct depression; posterior corners of the segments not produced into lobes exceeding the back margin; lateral carinae of segment 2 with five teeth, the ensuing nonporiferous segments with four prominent teeth on the outer margin; poriferous segments with five lateral teeth; pores in normal arrangement, opening just above the sinus formed between the last two marginal teeth.

Last segment with only a single row of non-tuberculate setae; apex produced into a mucro exceeding the anal valves; the latter with thin raised margins; preanal scale elliptical, the front and back margins similarly convex.

Legs projecting beyond the sides of the body by several joints; sterna broad, low and nearly flat; the anterior sternum of each mid-body segment separated from the posterior sternum by a broad and shallow transverse depression.

Type. *A. fragilis* spec. nov.

## ANTRIADESMUS FRAGILIS SPEC. NOV.

## Plate 1, figure 6

Female type and another female, A-5365, from White's Cave, near Mammoth Cave postoffice, Edmonson Co., Kentucky, Aug. 30, 1939.

Body colorless, 6.5 mm. long and approximately one tenth as wide; sides parallel from segment 2 to 18; dorsum strongly convex with the very narrow lateral keels evenly continuing the descent.

Head subglobular, as wide as the remainder of the body; the large evenly rounded vertex without a median furrow but beset with erect setae as is the surface in front of it and that of the cardo of each mandible; antennae long, as shown in figure 18, *a*; joints 1 and 7 shortest, subequal; joints 2 to 5 of intermediate length, much exceeded in length and thickness by joint 6.

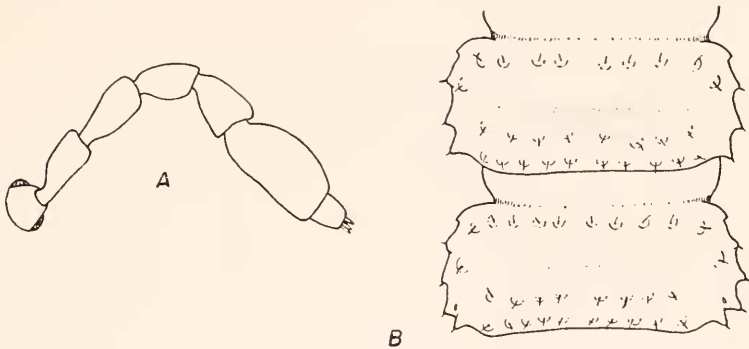


Fig. 18. *Antriaedesmus fragilis*. *a*, Antenna; *b*, Segments 11 and 12, dorsal view.

First segment considerably narrower than the head or the other segments but distinctly longer than segments 2, 3 or 4 and about equal to the others; shape almost semicircular, with the front margin evenly rounded and the back margin slightly convex; a series of 14 erect setae behind the front margin and a series of 8 setae in advance of the back margin, the median surface with 10 to 12 scattered setae.

Ensuing segments each with a broad, distinct, transverse median depression as shown in figure 18, *b*; the front half of the metazonite with a transverse anterior row of about 10 setae borne on small tubercles, the posterior half of the metazonite crossed by two similar

rows of setose tubercles, one near the posterior margin but never projecting beyond it, the other at the posterior fourth of the segment; one or two additional setae are on the lateral carinae removed from the dorsal series; lateral carinae projecting directly outward a very short distance from the sides of the body, those at the extremities produced neither forward nor backward; outer margin of carinae of segment 2 and all poriferous segments with five prominent acute teeth, the remaining non-poriferous carinae with four teeth; on all carinae all teeth, except the first, have an apical seta; posterior corner of the carinae not produced caudad beyond the back margin of the segment which is almost straight across or even somewhat convex; penultimate segment with sides rapidly converging caudally, suddenly reducing the width of the body.

Last segment with the apex produced beyond the anal valves and somewhat deflexed.

#### BRACHYDESMUS PALLIDUS Loomis

Many specimens, A-5023, from Crystal Caverns, 1 mile north of Strasburg, Shenandoah Co., Virginia, Aug. 14, 1939; 3 specimens, A-4895, on boards at the landing in Alexander's Caverns, near Naginey, Mifflin Co., Pennsylvania, Aug. 20, 1939; many specimens, A-5020, in Arch Springs Cave, 7.5 miles southwest of Water Street, Blair Co., Pennsylvania, Aug. 21, 1939.

All males in the above collections exhibit a character not mentioned in the original description of the species. Legs 14 to 17 inclusive have the second joint much more swollen than on any of the other legs and there is an almost circular area of short stiff hairs on the ventral face of the joint.